

## CRYSTALLIZATION AND MELTING BEHAVIOR OF LaRC CPI-2 POWDERS SYNTHESIZED FROM DIMETHYLACETAMIDE AND m-CRESOL

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### ABSTRACT:

The unusually strong dependence of melting temperature of LaRC CPI-2 (Langley Research Center, Crystalline PolyImide - second generation) powders upon synthetic conditions is examined in detail. Powders synthesized from dimethylacetamide (DMAc) display multiple melting transitions at ca. 345°C and 366°C, while powders from m-cresol melt singularly at ca. 409°C. The crystal lattice structure, as indicated from wide angle X-ray diffraction (WAXD), of the two powders is the same. The thermo-oxidative stability of the powders, determined through thermogravimetric analysis, is essentially the same. Likewise there is no significant differences found in the chemical structure of the two powders, as indicated by Fourier infrared spectroscopy (FTIR). High-temperature annealing of the powder from m-cresol yields a melting transition of nearly 490°C, while the highest achievable melting transition for the powder from DMAc is only 402°C. Rheological analysis reveals that the melt stability of the powder from m-cresol is very much greater than the powder from DMAc. Reasons for the divergent melting, melt stability and crystallization behavior are proposed in terms of a possible difference in molecular weight and an imine branching reaction.

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